

Pharmaceutical Design and Engineering – DTU

Master project proposal

PROJECT TITLE (preliminary, can be changed later):

Towards understanding the function of an important acute phase protein: Expression of SAA isotypes in *Drosophila melanogaster*, purification and biological characterization

PROPOSER / PROJECT SUPERVISOR (include contact details):

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PROJECT SYNOPSIS (½ page):

Serum amyloid A (SAA) proteins are a family of small apolipoproteins, which are able to bind high-density lipoproteins. Their expression is dramatically up-regulated during the acute phase response, which is the systemic reaction to inflammation. The best known isoforms are the SAA1, SAA2, and SAA3. SAA1 and SAA2 are induced during the acute phase response in the liver, whereas SAA3 is predominantly expressed locally.

Although the importance of SAA proteins is stressed by its high degree of evolutionary conservation amongst a large number of different organisms, its very tight regulation of expression during the acute phase response and the presence of isoforms with different tissue tropisms, their exact physiological role is yet to be discovered. It may play a beneficial role during inflammation and tissue injury and in cholesterol transport. There is also a great interest in studying its usefulness as a biomarker for inflammation, aging and neurodegenerative diseases, and especially the potential of the SAA isoforms as biomarkers, which is largely unexplored.

In this master project, the focus is on bovine SAA1 and SAA3 as well as “porcine SAA1”. In bovine, SAA3 can be readily measured in milk samples, making it a practical biomarker. “Porcine SAA1” has not been rigorously defined yet on the protein level so this part of the project will provide completely new data on this. Also, the SAA isoforms will be biologically characterized.

The work will be based on recombinantly expressed SAA isoforms. This will be done in *Drosophila melanogaster* in collaboration with Expres²ion A/S – part of this work has been done already, so protocols are in place. Biological characterization will be done in collaboration with a Belgian collaborator (2 months stay). There is also a possibility to pursue mass spectrometry development based on the defined isoforms produced in the project. The project can accommodate 2 students.